

Application No.: 09/240,632

Docket No.: 20402-00568-US

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wherein the phase shift keying provides periodically-spaced symbols which represent corresponding portions of the input digital signal in terms of differences between phases of the periodically-spaced symbols; and

wherein the at least 8-signal-point modulation assigns logic states of the input digital signal to respective signal points for a first symbol in response to a signal point used by a second symbol of the phase shift keying which precedes the first symbol.

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5. (Amended) A method as recited in claim 1, wherein the at least 8-signal-point modulation is at least 8 quadrature amplitude modulation.

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13. (Amended) A method as recited in claim 1, wherein a maximum of amplitudes corresponding to signal points of the at least 8-signal-point modulation in an I-Q plane is equal to an amplitude of a signal point of the phase shift keying in the I-Q plane.

37. (Amended) A transmission apparatus as recited in claim 33, wherein the symbols provided by the phase shift keying are used as a pilot symbol for estimating at least one of (1) a transmission path distortion and (2) a frequency offset.

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38. (Amended) A modulation method for modulating an input digital signal into a multi-value symbol stream, the modulation method comprising:

- generating a first multi-value modulation signal having first multi-value symbols with a first modulator;
- generating a second modulation signal containing second multi-value symbols by using a second modulator which are to be used as pilot symbol estimating at least one of (1) a channel distortion and (2) a frequency offset for demodulating said first multi-value modulation signal in a receiver; and
- inserting said second multi-value symbols into said first multi-value symbols such that the resultant multi-value symbols constitute said multi-value symbol stream.

39. (Amended) A modulation method as recited in claim 38, (1) said channel distortion and (2) said frequency offset are estimated from each of said second multi-value symbols.

Application No.: 09/240,632

Docket No.: 20402-00568-US

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40. (Amended) A modulation method as recited in claim 38, wherein differential encoding is done between symbols of the second modulation signal.

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42. (Amended) A modulation method as recited in one of claims 38, wherein the second modulation signal is phase shift keying (PSK) modulation.

45. (Amended) A modulation method as recited in one of claims 38, wherein the first modulation signal is quadrature phase shift keying (QPSK) modulation.

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46. (Amended) A modulation method as recited in one of claims 38, wherein the first modulation signal is at least 8-value modulation.

48. (Amended) A modulation method as recited in one of claims 38, wherein the first modulation signal is 16QAM and the second modulation signal is PSK modulation, and a maximum signal point amplitude of the second modulation system is equal to 0.9 to 1.5 times a maximum signal point amplitude of the first modulation signal.

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49. (Amended) A transmission apparatus comprising a first multi-value modulation system for subjecting an input digital signal to first modulation and outputting a first quadrature baseband signal, a second modulation system for subjecting the input digital signal to a second modulation and outputting a second quadrature baseband signal, wherein said second quadrature baseband signal is regularly inserted as a pilot signal into the first quadrature baseband signal wherein said second quadrature baseband signal is used for estimating a frequency offset and a channel distortion in a receiver.

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51. (Amended) A transmission apparatus as recited in claim 49, wherein differential encoding is done between symbols of the second modulation system.

Application No.: 09/240,632

Docket No.: 20402-00568-US

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53. (Amended) A transmission apparatus as recited in one of claims 49 or 51, wherein the second modulation system is phase shift keying (PSK) modulation.

56. (Amended) A transmission apparatus as recited in one of claims 49 or 51, wherein the first modulation system is quadrature phase shift keying (QPSK) modulation.

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57. (Amended) A transmission apparatus as recited in one of claims 49 or 51, wherein the first modulation system is at least 8-value modulation.

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59. (Amended) A transmission apparatus as recited in one of claims 49 or 51, wherein the first modulation system is 16QAM and the second modulation system is PSK modulation, and a maximum signal point amplitude of the second modulation system is equal to 0.9 to 1.5 times a maximum signal point amplitude of the first modulation system.

REMARKS

Claims 1-3, 13, 33, 37-40, 42-49, 51, and 53-59 are pending in the application. Favorable reconsideration of the application is requested.

Acknowledgement and receipt of the priority documents in the application, filed February 18, 1999 is requested. A copy of the postcard receipt as well as the Transmittal Letter for this submission is enclosed.

Acknowledgement of the priority is therefore requested.

Withdrawal of the objection to claims 41-48, 50-59 is requested. Claim 41 has been corrected, and the remaining claims suitably amended to avoid the objection under 37 C.F.R. § 1.75(c).